In [79]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [14]:
```
stdids = [1,2,3,4,5]
stdnames = ['Asad', 'Ali', 'Abid', 'Arham', 'Alyan']
stdDept = ['ICIT', 'GCBB', 'FIT', 'CoCIS', 'ICIT']
```

In [15]:
```
students = {
    'ID'   :    stdids ,
    'Name' :    stdnames ,
    'Dept' :    stdDept
}
```

In [18]:
```
st = pd.DataFrame(students)
st
```

Out[18]:

	ID	Name	Dept
0	1	Asad	ICIT
1	2	Ali	GCBB
2	3	Abid	FIT
3	4	Arham	CoCIS
4	5	Alyan	ICIT

In [ ]:

In [ ]:

In [ ]:

In [89]:
```
def f(x):
    return np.cos(x) - 1.3*x
```

In [90]:

```
lstRoot = list()
lstItr = list()
lsta = list()
lstb = list()

def Bisection(x,y,tol):
    a = x
    b = y

    count = 0
    while(np.abs(a-b)>=tol):
        count +=1
        c = (a+b)/2

        if (f(a) * f(c) > tol):
            a = c
        else:
            b = c

        lstRoot.append(c)
        lstItr.append(count)
        lsta.append(a)
        lstb.append(b)

    print('No of iterations ', count)
    return c
```

In [91]:

```
start_interval = -2
end_interval = 2
tolerence = 0.01

root = Bisection(start_interval,end_interval, tolerence)
```

```
No of iterations  9
```

In [92]:

```
Anstable = {
    'Iteration':lstItr,
    'Starting Interval': lsta,
    'Ending Interval' : lstb,
    'Root' : lstRoot

}
```

In [93]:

```
mytable = pd.DataFrame(Anstable)
mytable
```

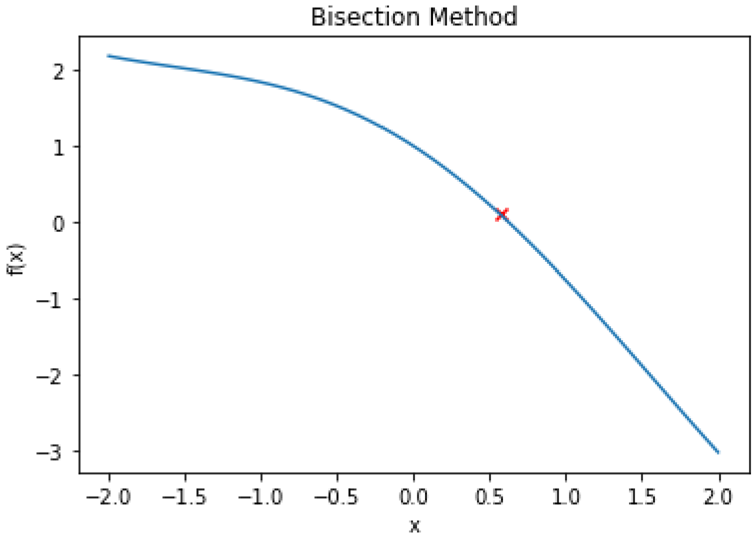
Out[93]:

	Iteration	Starting Interval	Ending Interval	Root
0	1	0.000000	2.000000	0.000000
1	2	0.000000	1.000000	1.000000
2	3	0.500000	1.000000	0.500000
3	4	0.500000	0.750000	0.750000
4	5	0.500000	0.625000	0.625000
5	6	0.562500	0.625000	0.562500
6	7	0.562500	0.593750	0.593750
7	8	0.562500	0.578125	0.578125
8	9	0.570312	0.578125	0.570312

In [97]:

```
plt.title('Bisection Method')
x = np.linspace(-2,2)
plt.xlabel('x')
plt.ylabel('f(x)')

plt.scatter(root, f(root), color='r', marker='x')
plt.plot(x,f(x))
plt.show();
```



In [ ]:

```
```